

**REMARKS**

Paragraphs beginning on pages 9, 10, 11, 14, 16, and 17 of the specification have been amended to correct typographical errors and for clarity at the suggestion of the Examiner. Applicants submit that no new matter has been added by way of amendment, and respectfully request that the amendments be entered in their entirety.

The paragraph at page 9, line 16 – page 10, line 9 has been amended to clarify the definition of efficiency. Support for this amendment is found on page 2, lines 23-28. Applicants respectfully submit that the definition of efficiency is clear as written. Furthermore, Applicants note that “lower heating value” is a term of art, well known to those of ordinary skill, and is defined as the energy released from the combustion of fuel to produce carbon dioxide and water vapor. (See, e.g., W.C. Reynolds and H.C. Perkins, *Engineering Thermodynamics*, 2<sup>nd</sup> Edition, p.427-28, McGraw Hill Book Co., 1977, a copy of which is enclosed for the convenience of the Examiner.) Should further clarification be required, it is respectfully requested that the Examiner expressly state what is unclear about the definition of efficiency so that Applicants may more fully respond to the objection.

The paragraph at page 10, lines 10-22 has been amended to clarify that the values of water to fuel ratios used as being greater than the calculated  $2n - 2x - p$  values. Support for this amendment is found in Table 1 on page 11.

The paragraph at page 11, line 19 – page 12, line 13 has been amended to reflect the issuance of the application entitled “Fuel Processor and Method for Generating Hydrogen for Fuel Cells” as U.S. Patent No. 6,713,040.

On page 14 of the application, the legend of Table 2 has been amended to reflect that the values of  $x_0$  in the table are based upon the heat of formation of liquid water. Support for this amendment is found on page 13, lines 9-12.

The paragraph at page 16, line 19 - page 17, line 3 has been replaced in order to correct  $\text{LaBaO}_3$  to  $\text{LaGaO}_3$  at page 17, line 1. Support for this correction may be found at page 5, line 21 of the specification, and claim 19, as originally filed.

The paragraph at page 17, line 24 – page 18, line 13 has been amended to correct a missing parenthesis.

Applicants respectfully submit that all informalities in the specification have been corrected and request that the objections to the specification be withdrawn.

Claims 1-22 are pending in the present patent application. Claims 1, 3, 4, 9, and 13-17 have been amended to define Applicants' invention with greater particularity. No new matter has been added and the amendments are fully supported by the specification and claims as originally filed. Support for the amended claim language is found at, but not limited to, the following

Claim 1	Claim 1 as originally filed; p. 11, lines 13-18; and p. 13, line 1 - p. 15, line 6.
Claim 9	Claim 9 as originally filed; and p. 5, lines 1-2.
Claims 3, 4, 13-17	Claims 3, 4, 13-17 as originally filed.

As a preliminary matter, Applicants note that claims 3, 4 and 14-17 have been amended to delete the definition of x, which appears in amended claim 1 from which claims 3, 4, and 14-17 depend. Claim 13 has been amended to correct a minor typographical error. Each of amended claims 3, 4, and 13-17 retains the same or broader claim scope and has not been amended for a reason related to patentability. Therefore, each of claims 3, 4, and 13-17 are entitled to a full range of equivalents.

# **I. Oath/Declaration**

Applicants respectfully disagree with the assertion in the Office Action that the Oath or Declaration filed on July 9, 2001 in the present application is defective. The defect allegedly

occurred because “the specification to which the oath or declaration is directed has not been adequately identified.” Applicants respectfully draw the Examiner’s attention to 37 C.F.R. 1.63(b)(1) which merely states that the oath or declaration must “identify the application to which it is directed.” The rule contains no requirement that the filing date and application number be provided. Section 602.02 of the M.P.E.P. to which the Examiner cites states only that

In requiring a new oath or declaration, the Examiner should always give the reason for the requirement and call attention to the fact that the application of which it is to form a part must be properly identified in the body of the new oath or declaration, preferably by giving the application number and date of filing. (Emphasis added.)

Thus, while it may be preferable for the declaration or oath to list the application number and date of filing, it is not required. Were such the case, no application could ever be filed with a complete oath or declaration as the application number can not be known at the time of filing. Applicants would always be forced to file with missing parts and pay the extra fees required for missing parts. This cannot be the law; indeed, the declaration and oath submitted in a companion case, S/N 09/816,676 , now U.S. Patent No. 6,713,040, was perfectly acceptable to the Patent Office though it also identified the application by title and attorney docket number only.

As submitted in the present application, the oath and declaration contain the complete title of the application and the attorney docket number. Since the title and docket number match those on the application to which the declaration was attached, Applicants respectfully submit that the specification to which the oath or declaration is directed has been adequately identified. Applicants, therefore, respectfully request that the Examiner withdraw the requirement for a new oath or declaration.

## **II. Information Disclosure Statement**

In the Office Action on page 2, paragraph 2, it was stated that four documents submitted in the Information Disclosure Statements filed on August 3, 2001 and November 26, 2002 failed to comply with 37 C.F.R. §§ 1.198(a)(2) or 1.198(b). Applicants acknowledge the Examiner's assertion that Wegeng et al. was illegible and submit herewith a clean copy of the same. Applicants respectfully request that the Examiner consider the Wegeng reference and initial the appropriate Form PTO-1449 submitted with the Information Disclosure Statement filed on August 3, 2000.

Applicants further submit herewith new Forms PTO-1449 and SB/08 correctly referring to Choudhary et al., Krumpelt et al., and Ahmed et al. As copies of these three references are already present in the file, Applicants respectfully request that the Examiner consider these references and initial the accompanying Forms PTO-1449 and SB/08.

### **III. Rejection of Claim 19 Under the First Paragraph of 35 U.S.C. § 112**

The Office Action rejects claim 19 under the first paragraph of 35 U.S.C. § 112 alleging that the claim fails to comply with the enablement requirement. Specifically, the Office Action states, "The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims." Applicants respectfully traverse this rejection for the reasons set forth below.

Specifically, the Examiner asserts that claim 19 lacks antecedent basis for ceramic oxides included in the group crystallizing in the fluorite structure in the specification. Applicants respectfully direct the Examiner's attention to U.S. Patent No. 5,929,286, the entire disclosure of which is incorporated by reference into the application (Specification, page 16, line 19 - page 17, line 3). In U.S. Patent No. 5,929,286, col. 2, lines 50-53, it is disclosed that :

Sources of ionic oxygen are oxides crystallizing in the fluorite or perovskite structure, such as for instance by way of example without limitation,  $\text{ZrO}_2$ ,  $\text{CeO}_2$ ,  $\text{Bi}_2\text{O}_3$ ,  $\text{BiVO}_4$ ,  $\text{LaGaO}_3$ .

Hence, the present application expressly teaches oxides crystallizing in the fluorite structure. Moreover, it is well known to those of ordinary skill in the art that, e.g.,  $\text{ZrO}_2$ ,  $\text{CeO}_2$ , and  $\text{Bi}_2\text{O}_3$  crystallize in the fluorite structure. Applicants, therefore, respectfully submit that there is ample antecedent basis in the specification for the claim 19 reference to oxides crystallizing in the fluorite structure, and request that the rejection be withdrawn.

#### **IV. Rejection of Claims 1-20 Under 35 U.S.C. § 102(b)**

The rejection of claims 1-20 as allegedly anticipated by Krumpelt et al. (U.S. Patent No. 5,929,286) under 35 U.S.C. § 102(b) is respectfully traversed. According to § 2131 of the M.P.E.P.,

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

Applicants respectfully submit that amended claim 1 and claims 2-20 are not anticipated by Krumpelt et al. because Krumpelt et al. does not teach each and every element of the claims. In the present method, as defined in amended claim 1, the molar ratio of air to fuel is controlled to provide optimal conditions for autothermally reforming the fuel into the hydrogen rich gas. To this end, amended claim 1 distinguishes over the cited art by reciting the step of determining the thermoneutral point of the fuel prior to or during the production of  $\text{H}_2$ . Krumpelt et al. does not disclose such a step and therefore cannot anticipate claim 1 as amended. Claims 2-20 depend directly or indirectly from claim 1 and therefore contain each and every element present therein. Hence, Krumpelt et al. cannot anticipate claims 2-20. Applicants respectfully request that the Examiner withdraw the rejection of claims 1-20 under 35 U.S.C. § 102(b).

#### **V. Rejection of Claims 21 and 22 Under 35 U.S.C. § 103**

Claim 21 has been rejected as allegedly obvious over Krumpelt et al. (U.S. Patent No. 5,929,286) in view of Collins et al. (U.S. Patent No. 5,458,857) under 35 U.S.C. § 103(a). Claim

22 has been rejected as allegedly obvious over Krumpelt et al. (U.S. Patent No. 5,929,286), in view of Collins et al. (U.S. Patent No. 5,458,857), and further in view of Ohata et al. (U.S. Patent No. 4,708,946) under 35 U.S.C. § 103(a). Both claims 21 and 22 depend from currently amended claim 1.

Specifically, with regard to claim 21, the Examiner stated,

It would have been obvious to one having ordinary skill in the art at the time of the invention to contact the hydrogen rich gas produced by the method of Krumpelt et al. with a second catalyst effective for converting carbon monoxide and water into carbon dioxide and H<sub>2</sub>, as taught by Collins et al...

Furthermore, with regard to claim 22, the Examiner stated,

It would have been obvious to one having ordinary skill in the art at the time of the invention to use the catalyst of Ohata et al. comprising a transition metal on cerium oxide or on ceria doped with a rare earth metal or alkaline earth element...

Applicants first note that according to § 2142 of the M.P.E.P.,

To establish a *prima facie* case of obviousness. Three basic criteria must be met. First there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Applicants respectfully submit that a proper *prima facie* case of obviousness with respect to claims 21 or 22 has not been established. Claims 21 and 22 depend from amended claim 1 and include the step of determining the thermoneutral point of the fuel prior to or during the production of H<sub>2</sub>. In contrast, Krumpelt et al. teaches the mixing of fuel, water, and oxygen, with an oxygen to fuel molar ratio less than or equal to the very broad range of  $n/2$ ; Krumpelt simply

does not disclose determining the thermoneutral point of the fuel. Therefore, Krumpelt et al. does not teach or suggest all of the elements of claims 21 or 22.

Moreover, neither Collins et al. nor Ohata et al. can cure this deficiency. Collins et al. discloses a combined reformer and shift reactor for the production of hydrogen from fuel, water, and oxygen. Collins fails to teach or suggest a method for optimizing the production of hydrogen by determining the thermoneutral point of a fuel prior to or during the production of H<sub>2</sub>. Ohata et al. discloses catalysts for the purification of exhaust gases from automobiles. Ohata et al. does not teach or suggest catalysts for the production of hydrogen, and it does not teach or suggest a method for determining the thermoneutral point of a fuel. Further, there is no suggestion in Ohata et al. to combine catalysts for the purification of automotive exhaust gases with a method for producing hydrogen. Because neither Collins et al. nor Ohata et al. teach or suggest a method for the production of hydrogen that includes determining the thermoneutral point of a fuel and there is no suggestion or motivation to combine either reference with Krumpelt et al., a proper case of *prima facie* obviousness has not been established with regard to claims 21 and 22. Applicants respectfully request that the Examiner withdraw the rejection of claims 21 and 22 under 35 U.S.C. § 103.


**CONCLUSION**

In view of the above amendments and remarks, it is respectfully submitted that all rejections have been overcome and that the Examiner reconsider and withdraw the pending rejections discussed above. The Examiner is cordially invited to telephone the undersigned at the number listed below if the Examiner believes such would be helpful in advancing the application to issuance.

Respectfully submitted,

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